

An Enhanced Internet Textbook: Revising Content Paradigms, User Interfaces, Searching, and Interactivity

Kevin J. Helmrick, B.S., John K. Harting, Ph.D.

University of Wisconsin Medical School, Madison, WI

Recent advances in World Wide Web (WWW or Web) server and browser technologies allow for the creation of enhanced Internet textbooks. Internet authors should revisit the topics of structured content models, user interfaces, and searching methodologies to harness the potential provided by this new technology. These enhanced textbooks overcome several of the limitations of the linear hypertext models used in the past to create Web resources. In addition, the introduction of new multimedia plug-ins for Internet browsers support inclusion of interactive multimedia applets into Internet textbooks. This paper describes the methods used at the University of Wisconsin Medical School (UWMS) to create enhanced Internet textbooks.

Using existing brainstem and spinal cord texts authored by John K. Harting, Internet textbooks were created for the first-year medical students enrolled in the spring 1996 neuroscience course at the UWMS. Students accessed the on-line texts through medical school and campus computing labs connected to the Internet. Additionally, texts were provided to the students on CD-ROM to facilitate home use. The Internet textbooks contain the full text of the original brainstem and spinal cord modules with extensive clinical correlations, numerous diagrams and images, interactive problem solving exercises with audio feedback, and a full-text searching engine. These textbook resources are located at the following URL: <http://www.anatomy.wisc.edu/>. At present, some of the enhanced features used in this model are supported only by the Netscape™ (version 2.0) Web browser.

Navigation within the neuroanatomy texts was a primary concern, and the content paradigm was structured to facilitate easy movement. The existing modules were organized by chapters, which served as the base of the navigation scheme. Each chapter was subdivided into major topics, which were consistent across chapters. The interface of the Internet textbook was designed to permit smooth navigation between the various chapters and subchapters of the text. Netscape™ frames were utilized to provide static "control panels" which allow students to update a frame dedicated to

displaying the text and graphics. In the brainstem and spinal cord modules, students can select and view any other chapter while viewing any page in the textbook, or they can immediately return to the table of contents. Once within a chapter, students can navigate between its subchapters, also from a common control panel.

Full text searching of the neuroanatomy text was implemented using a server-based searching engine. A criterion used to select the Web server was the ability of the server to generate indices of the Web contents. For example, the Website™ server by O'Reilly and Associates allows the server administrator to select a domain of documents to index, then creates a full-text index of the documents within that domain. Several independent indices can be maintained on one server. For example, indices could exist for the spinal cord text alone, the brainstem text alone, and a combined index for both the spinal cord and brainstem modules.

The original spinal cord and brainstem modules contained numerous problem solving exercises, and it was imperative that these teaching resources be included in the Internet textbook. Macromedia's Shockwave™ plug-in for the Netscape browser supports inclusion of Macromedia Director™ movies into the Internet textbook. Problem solving exercises, which consisted of several different question types, including multiple choice and matching, were created with Director™. Audio explanations associated with the answers to the multiple choice problems provide a source of directed feedback to the students.

Advances in Web server and browser technologies allow Web authors to create Internet textbooks which provide considerable improvement in content structure and usability when compared to prior Web implementations. Although the effectiveness of these enhancements is limited by the varied features supported by competing Internet browsers, this model provides an example of utilizing advanced Web features to create an enhanced Internet resource.